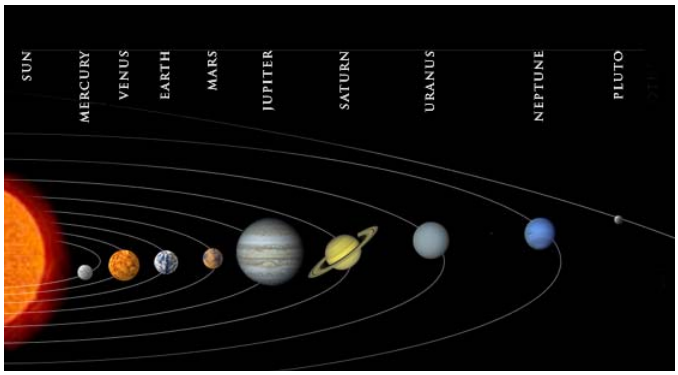
USGS science for a changing world
Astrogeology Research Program



Toilet Paper Solar System

Grade level: All

Objective:

- This lesson will introduce students to the idea of scale and distance in the solar system using an everyday roll of toilet paper.

Arizona State Standards:

- **6SC-P1. PO2.** Describe the processes explained by prominent scientific theories of the origin of the solar system

Time needed: 1 class period

Materials:

- 1 standard roll of toilet paper (provided)
- Marker
- Images of the planets (provided – use NASA Lithographs)

Procedure:

Using the student sheet as a guide, mark the distance between planets on the roll of toilet paper. As the toilet paper is unrolled have the students count or label the number of sheets and put a marker next to the spot where each planet would be. Scaled pictures of the planets could be created to use as labels.

In this model: 1 toilet paper sheet = 10,000,000 miles
Sun's diameter = 0.4 inches
Earth's diameter = 0.001 inch

Reference:

Modified from: http://solar.physics.montana.edu/tslater/plunger/tissue.htm

Additional Resources:

- http://www.vendian.org/mncharity/dir3/solarsystem/
- http://www.bradley.edu/las/phy/solar_system.html
- http://spacelink.nasa.gov/Educator.Focus/Articles/010_Solar_System/

_____Name

Student Sheet – Toilet Paper Solar System

Planetary Object	Distance from sun (in sheets)	Distance from previous object (in sheets)	Actual distance from the Sun (miles)	Actual distance from the Sun (AU)	Actual distance at the speed of light (300,000 km/s)
SUN	0	0	—	—	—
MERCURY	3.6	3.6	35,985,000	0.39	3 light minutes
VENUS	6.7	3.1	67,247,000	0.72	6 light minutes
EARTH	9.3	2.6	92,977,000	1.00	8.3 light minutes
MARS	14.1	4.8	141,641,000	1.52	12.5 light minutes
JUPITER	48.4	34.3	483,717,000	5.20	43.27 light minutes
SATURN	88.7	40.3	885,954,000	9.53	1 light hour
URANUS	178.6	90	1,788,129,000	19.23	2.6 light hours
NEPTUNE	280	101	2,801,802,000	30.14	4 light hours
PLUTO	366.4	86.4	3,701,057,000	39.81	5.5 light hours
Proxima Centauri	2,500,000				4.3 light years

*Proxima Centauri, the nearest star, is 2,500,000 sheets from the sun. This equates to about 200 miles of toilet paper (or about the distance to the Grand Canyon and back from Flagstaff).

Questions:

1. Would you say that the planets are located close together or far apart in space? Why?

2. Did this demonstration help you understand distances in space? If not, what could have been done to make this demonstration better?